

Bystander Presence and Response During Accidental and Undetermined Drug Overdose Deaths: Rhode Island, January 1, 2016–December 31, 2021

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ABSTRACT

With timely intervention from a bystander, drug overdose victims are more likely to survive. To characterize the frequency of bystander presence and identify overdose response barriers, we analyzed data from overdose fatalities occurring in Rhode Island from 2016 to 2021. Overall, about half (n=1,039; 48.7%) of all overdose deaths in Rhode Island had at least one bystander present. Among decedents who had at least one bystander who was unable to respond (n=338), top reasons of non-response were because they were spatially separated (64.8%), failed to recognize the signs of overdose (54.1%), or were unaware the victim was using drugs (40.2%). To promote bystander presence and address barriers to bystander response during an overdose, intervention strategies should include efforts that reduce solitary drug use and maximize bystander efficacy, including increasing awareness on the dangers of using drugs alone, increasing the availability of naloxone, and education on recognizing signs of overdose.

KEYWORDS: fatal overdose, substance use disorder, opioids, bystanders, naloxone, harm reduction

INTRODUCTION

Opioid overdose is the leading cause of injury-related deaths in the United States, and from 2020 to 2021, overdose deaths increased by 15% nationally.^{1,2} Rhode Island (RI) aligns with national trends and experienced a 13% increase from 2020 to 2021, and a majority of deaths were opioid-involved.³ Individuals who overdose outside of clinical settings are more likely to survive if they receive a timely intervention from a bystander and/or emergency personnel.⁴ Bystanders can reduce harm during an overdose, particularly when they are equipped with knowledge and life-saving resources to improve the efficacy of their response.⁵ To guide intervention efforts, we describe the frequency of bystander presence, factors associated with bystander presence, describe bystander response during an overdose, and identify barriers bystanders face to timely intervention among overdose decedents in Rhode Island.

METHODS

We obtained overdose fatalities of accidental or undetermined intent occurring between 2016 to 2021 from the RI State Unintentional Drug Overdose Reporting System (SUDORS). Abstractors for SUDORS capture information from death certificates, medical records, medical examiner or coroner reports, forensic toxicology results, and scene investigation reports when available.

In SUDORS, a potential bystander is classified as an individual aged 11 years and older who was physically nearby during or shortly preceding the drug overdose and had the opportunity to respond to the overdose; however, persons in different self-contained parts of larger buildings would not be considered as potential bystanders (e.g., a person in a different apartment in the same apartment building would not be considered a potential bystander).⁶ Bystander data are restricted to fatal overdoses with documentation of bystander presence from the scene investigation or the police, emergency medical services, and emergency department reports. Therefore, bystander data are likely underestimated. For this analysis, overdoses where there were no documented bystanders present at the scene or if it was unknown if a bystander was present were classified as having no bystander present at the time of overdose. We considered a bystander response to have occurred if any of the following circumstances were captured in SUDORS; bystander provision of sternal rub, stimulation, breathing or oxygen, CPR, naloxone administration, or other intervention. We created additional response categories (bystander called 9-1-1, provided transport to emergency department or police station) using the other bystander intervention free text field. We classified an overdose as having no bystander response if reasons for no response were captured for the fatal overdose (bystander did not recognize any abnormalities, they reported abnormalities but did not recognize them as signs of overdose, they did not know the victim was using drugs, they were using drugs and impaired, they were spatially separated, they were in public, or did not respond for another specified reason) and naloxone was not administered by a bystander. We created additional reason for no response categories (bystander was asleep) using the other reason for no response free text field. As more than one bystander could be present at the time of overdose, it is possible for response

and non-response, as well as multiple interventions or reasons for lack of intervention, to be reported for a single overdose.

We categorized the reported location of overdose into public (businesses, parks, sidewalks, roadways, schools, etc.), semi-public (treatment or residential facilities, such as hotels, motels, hospitals, and nursing facilities), and private settings (a private residence).

All cells with small cell count (<5) were suppressed due to RIDOH’s Small Number Reporting Policy. Statistical significance was determined using chi-square tests. All analyses were performed in SAS [Version 9.4]. This work was part of the Rhode Island Department of Health’s (RIDOH) response to the opioid overdose epidemic in Rhode Island and did not require institutional review board approval.

RESULTS

From January 1, 2016, to December 31, 2021, 2,133 individuals died of an accidental or undetermined drug overdose in RI. Overall, 1,039 (48.7%) victims had at least one bystander present at the time of the fatal overdose (Table 1). Bystander’s presence during an overdose increased from 42% in 2016 to 53% in 2021 (Figure 1).

Most overdose decedents were male (71.6%), non-Hispanic White (78.3%), and over the age of 25 (94.2%). When compared to individuals without a bystander present, decedents with a bystander present had a higher proportion of individuals who were younger (p<0.0001) and female (p=0.0321). No significant differences were observed in bystander presence by race/ethnicity. Opioids were a contributing cause in most fatal overdoses (85.7%), followed by fentanyl (67.0%), and cocaine (42.9%) (Table 2). No significant differences were found in substances contributing to cause of death when stratified by bystander presence. Additionally, most fatal overdoses occurred in private settings (81.1%) irrespective of bystander presence.

Among the 1,039 overdoses with documented bystander presence, the types of bystanders present at the time of overdose were most often family members (19.0%), intimate partners (15.0%), friends (12.5%), or roommates (7.5%) of the decedent (Table 3). Though bystanders were present, only 319 (30.7%) overdoses involved at least one bystander who responded to the overdose victim. Of these, 56.7% involved a bystander who called 9-1-1, 34.2% involved a bystander who performed CPR, and 27.6% involved a bystander who administered naloxone.

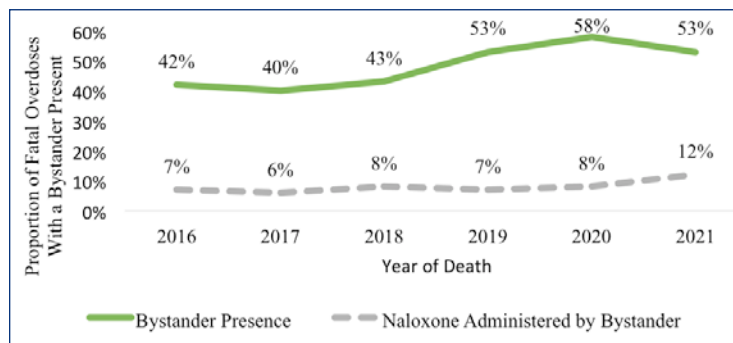
From 2016 to 2021, 338 (32.5%) of overdoses with a bystander present involved a bystander that was unable to respond to the overdose (Table 3). Among these overdoses, 64.8% involved bystanders who reported that they were

Table 1. Fatal overdose decedent demographics occurring by bystander presence, Rhode Island: 2016–2021

Demographics	Overall n=2,133 n (%)	One or More Bystanders Present n=1,039 n (%)	No Bystander Present n=1,094 n (%)	p-value ¹
Decedent Age				
<25	124 (5.8)	76 (7.3)	48 (4.4)	<0.0001 *
25–34	520 (24.4)	282 (27.1)	238 (21.8)	
35–44	522 (24.5)	273 (26.3)	249 (22.8)	
45–54	497 (23.3)	220 (21.2)	277 (25.3)	
55+	470 (22.0)	188 (18.1)	282 (25.8)	
Decedent Sex				
Male	1,528 (71.6)	722 (69.5)	806 (73.7)	0.0321 *
Female	605 (28.4)	317 (30.5)	288 (26.3)	
Decedent Race/Ethnicity²				
White, non-Hispanic	1,648 (78.3)	806 (78.2)	842 (78.3)	0.3811
Black, non-Hispanic	155 (7.4)	71 (6.9)	84 (7.8)	
Hispanic or Latino	272 (12.9)	142 (13.8)	130 (12.1)	
Non-Hispanic, Additional Category	31 (1.5)	12 (1.2)	19 (1.8)	

Source: State Unintentional Drug Overdose Reporting System (SUDORS). ¹Chi-square test. ² Excludes decedents with unknown race or ethnicity information. *Indicates statistical significance p<0.05 Note: Due to rounding, percentages may add to more than 100%.

Figure 1. Bystander presence and naloxone administration among fatal overdoses occurring in Rhode Island by year of death, 2016–2021.



Source: State Unintentional Drug Overdose Reporting System (SUDORS).

spatially separated from the decedent (e.g., in different rooms, but in the same house), 54.1% involved bystanders who reported they did not recognize the overdose, 16.6% involved bystanders who reported using drugs and were too impaired to respond, 10.1% involved bystanders who were asleep at the time of the overdose, 40.2% involved bystanders who were unaware victim was using drugs, and 10.1% reported abnormalities, but did not recognize the overdose. Overall, of the 1,039 overdoses with documented bystander presence, bystander response information was unknown for 453 (43.5%) overdoses.

Table 2. Circumstances surrounding accidental and undetermined fatal overdose in Rhode Island by bystander presence, 2016–2021

	Overall n=2,133 n (%)	One or More Bystanders Present n=1,039 n (%)	No Bystander Present n=1,094 n (%)	p-value ¹
Substances Contributing to Cause of Death²				
Opioid	1,828 (85.7)	899 (86.5)	929 (84.9)	0.289
Fentanyl	1,429 (67.0)	726 (69.9)	703 (64.3)	0.0058*
Cocaine	916 (42.9)	456 (43.9)	460 (42.1)	0.3906
Benzodiazepine	380 (17.8)	182 (17.5)	198 (18.1)	0.7256
Alcohol	541 (25.4)	275 (26.5)	266 (24.3)	0.2533
Fatal Overdose Setting³				
Private	1,730 (81.1)	866 (83.4)	864 (79.0)	0.005*
Semi-Public	119 (5.6)	54 (5.2)	65 (5.9)	
Public	117 (5.5)	59 (5.7)	58 (5.3)	
Unknown/Other	167 (7.8)	60 (5.8)	107 (9.8)	

Source: State Unintentional Drug Overdose Reporting System (SUDORS).
¹ Chi-square test. ² Substance categories are not mutually exclusive. More than one substance can contribute to cause of death. ³ Private includes personal apartment or residence, semi-public includes hotel, motel, shelter, nursing home, hospital, prison, group home, assisted living, or treatment facility, public includes theater, concert, show, office, park, school, bar/restaurant, roadway, or cemetery.
 *Indicates statistical significance p<0.05 Note: Due to rounding, percentages may add to more than 100%.

Overall, the availability and administration of naloxone during an overdose has been increasing over time from 7% in 2016 to 12% in 2021 (Figure 1). Among overdoses where naloxone was administered by a bystander (n=88), naloxone was commonly administered by a family member (28.4%), intimate partner (28.4%), or a friend (29.6%) of the individual experiencing fatal overdose. The number of doses administered to the decedent was unknown for 15.9% of overdoses, while 51.1% involved the administration of one dose of naloxone, and the remaining 32.9% involved the administration of two or more doses.

DISCUSSION

In RI, approximately half of all fatal overdoses had a bystander present (48.7%) at the time of death, indicating that many individuals continue to use drugs alone. While there was slight variation, the percentage of individuals with a potential bystander present was similar when stratified by age, sex, race/ethnicity, substances contributing to cause of death, and overdose location, highlighting the need for education across all population subgroups. Among overdose fatalities with a bystander present, roughly one-third had documented reasons a bystander was unable to respond, with the most common reasons because they were spatially separated, did not recognize the overdose, or did not know that the individual was using substances. Because bystanders can

Table 3. Bystander presence and reported response among accidental and undetermined fatal overdoses in Rhode Island, 2016–2021.

	Fatal Overdoses with One or More Bystanders Present n=1,039 n (%)
Types of Bystanders Present¹	
Family Member	197 (19.0)
Intimate Partner	156 (15.0)
Friend	130 (12.5)
Roommate	78 (7.5)
Stranger	26 (2.5)
Medical Personnel	10 (1.0)
Person Using Drugs	71 (6.8)
Other	51 (4.9)
Reported Response to Overdose²	
One or More Bystanders Responded to Overdose	319 (30.7)
Called 9-1-1	181 (56.7)
Provided CPR	109 (34.2)
Administered Naloxone	88 (27.6)
Provided Stimulation	24 (7.5)
Transported to Emergency Department or Police Station	8 (2.5)
Provided Oxygen or Breathing	6 (1.9)
Reported Not Responding to Overdose²	
One or More Bystanders Reported Not Responding to Overdose	338 (32.5)
Spatially Separated	219 (64.8)
Did Not Recognize Overdose	183 (54.1)
Was Asleep	34 (10.1)
Unaware Victim was Using Drugs	136 (40.2)
Was Using Drugs or Impaired	56 (16.6)
In Public Place	6 (1.8)
Reported Abnormality, but did not Recognize Overdose	35 (10.1)

Source: State Unintentional Drug Overdose Reporting System (SUDORS).
¹ More than one type of bystander may be present at time of fatal overdose.
² Categories are not mutually exclusive, more than one type of response may have been performed. Bystanders may have reported more than one reason for not responding to the overdose. Note: Due to rounding, percentages may add to more than 100%.

provide opportunities for a life-saving action when properly prepared and informed, reducing stigma around substance use, providing education on recognizing a drug overdose and overdose response strategies, and increasing access to harm reduction resources such as naloxone in non-clinical settings remain essential.

This analysis shows several potential points for overdose prevention. First, despite an increase in the proportion of fatal overdoses with a bystander present at the time of

death, 51% of victims experienced fatal overdose without a bystander present. Additionally, among overdoses with a bystander present, the most common reason a bystander did not respond to overdose was due to separation from the victim at the time of overdose (64.8%) (Table 3). Decreasing the number of individuals who use drugs alone, either through anti-stigma trainings, community education, communications campaigns, or using the National Never Use Alone Hotline, may reduce the number of individuals lost to overdose.⁷ In a recent study that forecasted the potential impact of increasing witnessed overdoses and availability of naloxone between 2023 to 2025 in RI, a combined increase in naloxone availability in private and semi-private settings and a 60% probability increase in witnessed overdoses could avert as many as 37.4% of RI's opioid overdose deaths by 2025.⁸ However, increasing naloxone availability with no change in bystander presence was only estimated to decrease overdose fatalities by 9%, highlighting the important role bystanders play in reducing overdose fatalities and the risk of solitary substance use.⁸

When an overdose occurs in non-clinical settings, bystanders can reduce the risk of a fatal outcome if they are trained and equipped to intervene in a timely manner.⁴ Among incidents in which a bystander responded to the overdose victim and the response was recorded, the most common responses included calling 9-1-1 (56.7%), performing CPR (34.2%), and administering naloxone (27.6%). Fortunately, these responses do closely align with the recommended actions that RIDOH promotes, which include 1) try to keep the person awake, 2) call 9-1-1, 3) administer naloxone if available, 4) try to support breathing, but if the person is not breathing, begin CPR as directed by 9-1-1.⁹ While naloxone distribution can help address the overdose crisis, naloxone is rarely self-administered in an emergency and bystanders are an important source of primary prevention.⁵ In this analysis, fewer than 30% of bystanders who reported administering naloxone outside of a clinical setting, and while trends have been increasing over time (Figure 1), this work highlights the continued need of naloxone distribution and training, both for individuals who know people who use drugs, and those who use drugs themselves.

The bystander intervention process is complex and there are situational barriers that can prevent bystanders from intervening during an overdose.⁴ Among the fatal overdoses in which a bystander reported not responding to the overdose, 54% of overdoses reported a bystander not recognizing that the victim was experiencing an overdose and 40% reported not knowing the victim was using substances. The inadequate knowledge among bystanders in recognizing an overdose calls for continued education to improve bystander efficacy by expanding education about the signs of drug overdose, overdose response strategies, and increasing access to harm reduction resources such as naloxone in private settings.¹⁰

Prioritizing advocacy for reducing stigma about substance use disorder include collaborating with persons who use drugs and their surrogates to reduce the harmful consequences associated with drug use while addressing misinformation that stigmatizes individuals who use drugs.¹¹ Most overdoses occurred in private locations, and bystanders present during an overdose event most often identified as a family member, intimate partner, or friend of the decedent as opposed to strangers or other members of the community. As many bystanders who did not intervene reported that they were spatially separated or unaware the individual was using substances, it is likely that stigma hindered communication around substance use and/or potential bystander intervention prior to the overdose event. When potential bystanders are unaware an individual uses drugs, they can easily misdiagnose the seriousness of the situation and may be insufficiently alarmed leading to nonintervention.¹² Efforts to reduce stigma around substance use can help better inform and direct bystanders' response before and during an overdose event. The Overdose Fatality Review Team at RIDOH continues to make equitable strides aimed at exploring missing opportunities and recommending intervention strategies to increase survival among overdose victims in RI, including proposing the following key strategies to prevent overdose in the state: 1) Expand messaging about illicit drug supply and safer drug use practices, 2) Provide anti-stigma education across systems, 3) Establish more resources for families.¹³

When comparing bystanders present during an overdose with surrounding states, RI (48.7%) had a slightly lower proportion of fatal overdoses in which a bystander was present when compared to Connecticut (54.6%) and Massachusetts (52.3%).¹⁴

Finally, it is important to acknowledge that this study was limited to fatal overdoses, and by design does not capture overdose situations where bystanders successfully responded to an overdose. In 2023, over 2,300 non-fatal opioid overdoses will be attended by healthcare professionals, including emergency medical services and the emergency department staff. While not easy to quantify, it is likely in most of these cases bystanders played a role in reversing the overdose through calling 9-1-1, providing naloxone, or CPR. This has likely been further enhanced by the RI E-9-1-1 Uniform Emergency Telephone System advanced telecommunicator training implemented in August 2022, which provides callers with additional instruction for administering naloxone and performing CPR prior to arrival of emergency medical services. Outside of this, prior work in RI has shown only 60% of bystanders call 9-1-1 when witnessing an overdose event, so it is likely bystanders additionally played a role in reversing at least another 1,500 overdoses in 2023 that never made it to the healthcare system.¹⁵

This study is subject to limitations. First, SUDORS data is limited to information and records available at the time

of case abstraction, which may potentially underestimate relevant circumstances surrounding the cause of death. Thus, the true number of overdoses where a bystander was present is likely to be undercounted. Second, bystander response and barriers to response at the time of overdose are reported by bystanders during scene investigations and cannot be entirely verified. Third, the analysis did not determine underlying barriers that may have prevented overdose intervention such as naloxone availability or bystander's reluctance to call law enforcement (such as for fear of arrest). Future analysis should explore potential underlying barriers faced by bystanders at the time of overdose, substance use treatment barriers, and missed intervention opportunities during the onset of the COVID-19 pandemic which can inform future emergency responses to reduce fatal overdoses. Finally, this study describes bystander presence and response among fatal overdoses and should not be used to describe or evaluate bystander effectiveness among non-fatal overdose events.

CONCLUSIONS

With the increasing rate of fatal overdoses in the United States and in RI, bystanders act as primary sources of prevention during an overdose.⁵ As such, future intervention efforts should aim at training potential bystanders to intervene and provide timely and actionable aid to overdose victims, thereby increasing efficacy to respond in emergency situations. Harm reduction strategies such as administering naloxone, recognizing signs of overdose, and stigma reduction are essential to embolden bystanders to diffuse the emergency and potentially avert the fatal outcome prior to the arrival of first responders.

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